

# Water Quality Criteria Applicable to Animas River from its confluence with the San Juan R

## DO, Temperature, and pH Criteria

### *Marginal Coldwater Aquatic Life Use*

Dissolved oxygen	6 mg/L		
Temperature (ST3)	77 deg F	=	25 deg C
Temperature (max)	84 deg F	=	29 deg C
pH range	6.6-9.0		

### *Warmwater Aquatic Life Use*

Dissolved oxygen	5 mg/L		
Temperature (max)	90 deg F	=	32.2 deg C
pH range	6.6-9.0		

## Bacteria

E. coli	126 cfu/100 mL (monthly geometric mean)
E. coli	410 cfu/100 mL (single sample max)

## Turbidity

When background turbidity is <50 NTU      then      Turbidity should not increase by more than 10 NTU

When background turbidity is >50 NTU      then      Turbidity should not increase by more than 20%

## Toxics Criteria (most stringent must be met)

Values are in ug/L unless otherwise specified

For Ammonia aquatic life criteria - please refer to "Ammonia ALC" tab

Pollutant	CAS Number	Domestic Water Supply	Irrigation	Livestock Watering	Wildlife Habitat	Aquatic Life
Aluminum, dissolved	7429-90-5		5,000			
Aluminum, total recoverable	7429-90-5					a
Antimony, dissolved	7440-36-0	6				
Arsenic, dissolved	7440-38-2	10	100	200		340
Asbestos	1332-21-4	7,000,000 fibers/L				
Barium, dissolved	7440-39-3	2,000				
Beryllium, dissolved	7440-41-7	4				
Boron, dissolved	7440-42-8		750	5,000		
Cadmium, dissolved	7440-43-9	5	10	50		a
Chlorine residual	7782-50-5				11	19
Chromium III, dissolved	16065-83-1					a
Chromium VI, dissolved	18540-29-9					16
Chromium, dissolved	7440-47-3	100	100	1,000		

Cobalt, dissolved	7440-48-4		50	1,000		
Copper, dissolved	7440-50-8	1300	200	500		a
Cyanide, total recoverable	57-12-5	200			5.2	22.0
Lead, dissolved	7439-92-1	15	5,000	100		a
Manganese, dissolved	7439-96-5					a
Mercury	7439-97-6	2		10	0.77	
Mercury, dissolved	7439-97-6					1.4
Methylmercury	22967-92-6					
Molybdenum, dissolved	7439-98-7		1,000			
Molybdenum, total recoverable	7439-98-7					7,920
Nickel, dissolved	7440-02-0	700				a
Nitrate as N		10 mg/L				
Nitrite + Nitrate				132 mg/L		
Selenium, dissolved	7782-49-2	50	0.13 mg/L (or 0.25 mg/L when Sulfate >500 mg/L)	50		
Selenium, total recoverable	7782-49-2				5.0	20.0
Silver, dissolved	7440-22-4					a
Thallium, dissolved	7440-28-0	2				
Uranium, dissolved	7440-61-1	30				
Vanadium, dissolved	7440-62-2		100	100		
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a
Adjusted gross alpha		15 pCi/L		15 pCi/L		
Radium 226 + Radium 228		5 pCi/L		30.0 pCi/L		
Strontium 90		8 pCi/L				
Tritium		20,000 pCi/L		20,000 pCi/L		
Acenaphthene	83-32-9	2,100				
Acrolein	107-02-8	18				
Acrylonitrile	107-13-1	0.65				
Aldrin	309-00-2	0.021				3.0
Anthracene	120-12-7	10,500				
Benzene	71-43-2	5				
Benzidine	92-87-5	0.0015				
Benzoanthracene	56-55-3	0.048				
Benzoapyprene	50-32-8	0.2				
Benzo(b)fluoranthene	205-99-2	0.048				
Benzo(k)fluoranthene	207-08-9	0.048				
alpha-BHC	319-84-6	0.056				
beta-BHC	319-85-7	0.091				
Gamma-BHC (Lindane)	58-89-9	0.20				0.95

Bis(2-chloroethyl) ether	111-44-4	0.30				
Bis(2-chloroisopropyl) ether	108-60-1	1,400				
Bis(2-ethylhexyl) phthalate	117817	6				
Bromoform	75-25-2	44				
Butylbenzyl phthalate	85-68-7	7,000				
Carbon tetrachloride	56-23-5	5				
Chlordane	57-74-9	2				2.4
Chlorobenzene	108-90-7	100				
Chlorodibromomethane	124-48-1	4.2				
Chloroform	67-66-3	57				
2-Chloronaphthalene	91-58-7	2,800				
2-Chlorophenol	95-57-8	175				
Chrysene	218-01-9	0.048				
Diazinon	333-41-5					0.17
4,4'-DDT and derivatives		1.0			0.001	1.1
Dibenzo(a,h)anthracene	53-70-3	0.048				
Dibutyl phthalate	84-74-2	3,500				
1,2-Dichlorobenzene	95-50-1	600				
1,3-Dichlorobenzene	541-73-1	469				
1,4-Dichlorobenzene	106-46-7	75				
3,3'-Dichlorobenzidine	91-94-1	0.78				
Dichlorobromomethane	75-27-4	5.6				
1,2-Dichloroethane	107-06-2	5				
1,1-Dichloroethylene	75-35-4	7				
2,4-Dichlorophenol	120-83-2	105				
1,2-Dichloropropane	78-87-5	5.0				
1,3-Dichloropropene	542-75-6	3.5				
Dieldrin	60-57-1	0.022				0.24
Diethyl phthalate	84-66-2	28,000				
Dimethyl phthalate	131-11-3	350,000				
2,4-Dimethylphenol	105-67-9	700				
2,4-Dinitrophenol	51-28-5	70				
2,4-Dinitrotoluene	121-14-2	1.1				
Dioxin		3.0E-05				
1,2-Diphenylhydrazine	122-66-7	0.44				
alpha-Endosulfan	959-98-8	62				0.22
beta-Endosulfan	33213-65-9	62				0.22
Endosulfan sulfate	1031-07-8	62				
Endrin	72-20-8	2				0.086
Endrin aldehyde	7421-93-4	10.5				
Ethylbenzene	100-41-4	700				
Fluoranthene	206-44-0	1,400				
Fluorene	86-73-7	1,400				
Heptachlor	76-44-8	0.40				0.52

Heptachlor epoxide	1024-57-3	0.20				0.52
Hexachlorobenzene	118-74-1	1				
Hexachlorobutadiene	87-68-3	4.5				
Hexachlorocyclopentadiene	77-47-4	50				
Hexachloroethane	67-72-1	25				
Ideno(1,2,3-cd)pyrene	193-39-5	0.048				
Isophorone	78-59-1	368				
Methyl bromide	74-83-9	49				
2-Methyl-4,6-dinitrophenol	534-52-1	14				
Methylene chloride	75-09-2	5				
Nitrobenzene	98-95-3	18				
N-Nitrosodimethylamine	62-75-9	0.0069				
N-Nitrosodi-n-propylamine	621-64-7	0.050				
N-Nitrosodiphenylamine	86-30-6	71				
Nonylphenol	84852-15-3					28
Polychlorinated Byphenyls (PCBs)	1336-36-3	0.50			0.014	2
Pentachlorophenol	87-86-5	1.0				19
Phenol	108-95-2	10,500				
Pyrene	129-00-0	1,050				
1,1,2,2-Tetrachloroethane	79-34-5	1.8				
Tetrachloroethylene	127-18-4	5				
Toluene	108-88-3	1,000				
Toxaphene	8001-35-2	3				0.73
1,2-Trans-dichloroethylene	156-60-5	100				
1,2,4-Trichlorobenzene	120-82-1	70				
1,1,1-Trichloroethane	71-55-6	200				
1,1,2-Trichloroethane	79-00-5	5				
Trichloroethylene	79-01-6	5				
2,4,6-Trichlorophenol	88-06-2	32				
Vinyl chloride	75-01-4	2				

iver upstream to Estes Arroyo.

Aquatic Life		
Chronic	Human Health-Organism Only	Type
a		
	640	P
150	9.0	C,P
a		
11		
a		
11		

"a" means refer to "Metals ALC" tab

a		
5.2	140	
a		
a		
0.77		
	0.3 mg/kg in fish tissue	P
1,895		
a	4,600	P
	4,200	P
5.0		
	0.47	P
a	26,000	P
	990	
	9	
	2.5	C
	0.00050	C,P
	40,000	
	510	C
	0.0020	C
	0.18	C
	0.18	C,P
	0.18	C
	0.18	C
	0.049	C
	0.17	C
	1.8	

	5.3	C
	65,000	
	22	C
	1,400	C
	1,900	
	16	C
0.0043	0.0081	C,P
	1,600	
	130	C
	4,700	C
	1,600	
	150	
	0.18	C
0.17		
0.001	0.0022	C,P
	0.18	C
	4,500	
	1,300	
	960	
	190	
	0.28	C
	170	C
	370	C
	7,100	C
	290	
	150	C
	210	C
0.056	0.00054	C,P
	44,000	
	1,100,000	
	850	
	5,300	
	34	C
	5.1E-08	C,P
	2.0	C
0.056	89	
0.056	89	
	89	
0.036	0.060	
	0.30	
	2,100	
	140	
	5,300	
0.0038	0.00079	C

0.0038	0.00039	C
	0.0029	C,P
	180	C
	1,100	
	33	C
	0.18	C
	9,600	C
	1,500	
	280	
	5,900	C
	690	
	30	C
	5.1	C
	60	C
6.6		
0.014	0.00064	C,P
15	30	C
	860,000	
	4,000	
	40	C
	33	C,P
	15,000	
0.0002	0.0028	C
	10,000	
	70	
	160	C
	300	C
	24	C
	24	C

# Water Quality Criteria Applicable to Animas River from Estes Arroyo to New Mexico/Col

## DO, Temperature, and pH Criteria

### **Coldwater Aquatic Life Use**

Dissolved oxygen	6 mg/L		
Temperature (ST3)	68 deg F	=	20 deg C
Temperature (max)	75 deg F	=	24 deg C
pH range	6.6-8.8		

## Bacteria

E. coli	126 cfu/100 mL (monthly geometric mean)
E. coli	410 cfu/100 mL (single sample max)

## Turbidity

When background turbidity is <50 NTU	then	Turbidity should not increase by more than 10 NTU
When background turbidity is >50 NTU	then	Turbidity should not increase by more than 20%

## Nutrients

Phosphorus (unfiltered sample)	0.1 mg/L	(maximum)
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## Toxics Criteria (most stringent must be met)

Values are in ug/L unless otherwise specified

For Ammonia aquatic life criteria - please refer to "Ammonia ALC" tab

Pollutant	CAS Number	Domestic Water Supply	Irrigation	Livestock Watering	Wildlife Habitat	Aquatic Life
Aluminum, dissolved	7429-90-5		5,000			
Aluminum, total recoverable	7429-90-5					a
Antimony, dissolved	7440-36-0	6				
Arsenic, dissolved	7440-38-2	10	100	200		340
Asbestos	1332-21-4	7,000,000 fibers/L				
Barium, dissolved	7440-39-3	2,000				
Beryllium, dissolved	7440-41-7	4				
Boron, dissolved	7440-42-8		750	5,000		
Cadmium, dissolved	7440-43-9	5	10	50		a
Chlorine residual	7782-50-5				11	19
Chromium III, dissolved	16065-83-1					a
Chromium VI, dissolved	18540-29-9					16
Chromium, dissolved	7440-47-3	100	100	1,000		

Cobalt, dissolved	7440-48-4		50	1,000		
Copper, dissolved	7440-50-8	1300	200	500		a
Cyanide, total recoverable	57-12-5	200			5.2	22.0
Lead, dissolved	7439-92-1	15	5,000	100		a
Manganese, dissolved	7439-96-5					a
Mercury	7439-97-6	2		10	0.77	
Mercury, dissolved	7439-97-6					1.4
Methylmercury	22967-92-6					
Molybdenum, dissolved	7439-98-7		1,000			
Molybdenum, total recoverable	7439-98-7					7,920
Nickel, dissolved	7440-02-0	700				a
Nitrate as N		10 mg/L				
Nitrite + Nitrate				132 mg/L		
Selenium, dissolved	7782-49-2	50	0.13 mg/L (or 0.25 mg/L when Sulfate >500 mg/L)	50		
Selenium, total recoverable	7782-49-2				5.0	20.0
Silver, dissolved	7440-22-4					a
Thallium, dissolved	7440-28-0	2				
Uranium, dissolved	7440-61-1	30				
Vanadium, dissolved	7440-62-2		100	100		
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a
Adjusted gross alpha		15 pCi/L		15 pCi/L		
Radium 226 + Radium 228		5 pCi/L		30.0 pCi/L		
Strontium 90		8 pCi/L				
Tritium		20,000 pCi/L		20,000 pCi/L		
Acenaphthene	83-32-9	2,100				
Acrolein	107-02-8	18				
Acrylonitrile	107-13-1	0.65				
Aldrin	309-00-2	0.021				3.0
Anthracene	120-12-7	10,500				
Benzene	71-43-2	5				
Benzidine	92-87-5	0.0015				
Benzoanthracene	56-55-3	0.048				
Benzoapyprene	50-32-8	0.2				
Benzo(b)fluoranthene	205-99-2	0.048				
Benzo(k)fluoranthene	207-08-9	0.048				
alpha-BHC	319-84-6	0.056				
beta-BHC	319-85-7	0.091				
Gamma-BHC (Lindane)	58-89-9	0.20				0.95

Bis(2-chloroethyl) ether	111-44-4	0.30				
Bis(2-chloroisopropyl) ether	108-60-1	1,400				
Bis(2-ethylhexyl) phthalate	117817	6				
Bromoform	75-25-2	44				
Butylbenzyl phthalate	85-68-7	7,000				
Carbon tetrachloride	56-23-5	5				
Chlordane	57-74-9	2				2.4
Chlorobenzene	108-90-7	100				
Chlorodibromomethane	124-48-1	4.2				
Chloroform	67-66-3	57				
2-Chloronaphthalene	91-58-7	2,800				
2-Chlorophenol	95-57-8	175				
Chrysene	218-01-9	0.048				
Diazinon	333-41-5					0.17
4,4'-DDT and derivatives		1.0			0.001	1.1
Dibenzo(a,h)anthracene	53-70-3	0.048				
Dibutyl phthalate	84-74-2	3,500				
1,2-Dichlorobenzene	95-50-1	600				
1,3-Dichlorobenzene	541-73-1	469				
1,4-Dichlorobenzene	106-46-7	75				
3,3'-Dichlorobenzidine	91-94-1	0.78				
Dichlorobromomethane	75-27-4	5.6				
1,2-Dichloroethane	107-06-2	5				
1,1-Dichloroethylene	75-35-4	7				
2,4-Dichlorophenol	120-83-2	105				
1,2-Dichloropropane	78-87-5	5.0				
1,3-Dichloropropene	542-75-6	3.5				
Dieldrin	60-57-1	0.022				0.24
Diethyl phthalate	84-66-2	28,000				
Dimethyl phthalate	131-11-3	350,000				
2,4-Dimethylphenol	105-67-9	700				
2,4-Dinitrophenol	51-28-5	70				
2,4-Dinitrotoluene	121-14-2	1.1				
Dioxin		3.0E-05				
1,2-Diphenylhydrazine	122-66-7	0.44				
alpha-Endosulfan	959-98-8	62				0.22
beta-Endosulfan	33213-65-9	62				0.22
Endosulfan sulfate	1031-07-8	62				
Endrin	72-20-8	2				0.086
Endrin aldehyde	7421-93-4	10.5				
Ethylbenzene	100-41-4	700				
Fluoranthene	206-44-0	1,400				
Fluorene	86-73-7	1,400				
Heptachlor	76-44-8	0.40				0.52

Heptachlor epoxide	1024-57-3	0.20				0.52
Hexachlorobenzene	118-74-1	1				
Hexachlorobutadiene	87-68-3	4.5				
Hexachlorocyclopentadiene	77-47-4	50				
Hexachloroethane	67-72-1	25				
Ideno(1,2,3-cd)pyrene	193-39-5	0.048				
Isophorone	78-59-1	368				
Methyl bromide	74-83-9	49				
2-Methyl-4,6-dinitrophenol	534-52-1	14				
Methylene chloride	75-09-2	5				
Nitrobenzene	98-95-3	18				
N-Nitrosodimethylamine	62-75-9	0.0069				
N-Nitrosodi-n-propylamine	621-64-7	0.050				
N-Nitrosodiphenylamine	86-30-6	71				
Nonylphenol	84852-15-3					28
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.50			0.014	2
Pentachlorophenol	87-86-5	1.0				19
Phenol	108-95-2	10,500				
Pyrene	129-00-0	1,050				
1,1,2,2-Tetrachloroethane	79-34-5	1.8				
Tetrachloroethylene	127-18-4	5				
Toluene	108-88-3	1,000				
Toxaphene	8001-35-2	3				0.73
1,2-Trans-dichloroethylene	156-60-5	100				
1,2,4-Trichlorobenzene	120-82-1	70				
1,1,1-Trichloroethane	71-55-6	200				
1,1,2-Trichloroethane	79-00-5	5				
Trichloroethylene	79-01-6	5				
2,4,6-Trichlorophenol	88-06-2	32				
Vinyl chloride	75-01-4	2				

#### Footnote "a"

Acute aquatic life criteria for metals. The equation to calculate acute criteria in µg/L is  $\exp(m_A[\ln(\text{hardness})] + b_A)(CF)$ . Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department. The equation parameters are as follows:

Metal	$m_A$	$b_A$	Conversion factor (CF)
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Aluminum (Al)	1.3695	1.8308	
Cadmium (Cd)	0.8968	-3.5699	1.136672-[ln hardness](0.041838)]
Chromium (Cr) III	0.8190	3.7256	0.316
Copper (Cu)	0.9422	-1.700	0.960
Lead (Pb)	1.273	-1.460	1.46203-[ln hardness](0.145712)]
Manganese (Mn)	0.3331	6.4676	
Nickel (Ni)	0.8460	2.255	0.998
Silver (Ag)	1.72	-6.59	0.85
Zinc (Zn)	0.9094	0.9095	0.978

Chronic aquatic life criteria for metals. The equation to calculate chronic criteria in  $\mu\text{g/L}$  is  $\exp(mC[\ln(\text{hardness})] + bC)(CF)$ . Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department. The equation parameters are as follows:

Metal	mc	bc	Conversion factor (CF)
Aluminum (Al)	1.3695	0.9161	
Cadmium (Cd)	0.7647	-4.2180	1.101672-[ln hardness](0.041838)]
Chromium (Cr) III	0.8190	0.6848	0.860
Copper (Cu)	0.8545	-1.702	0.960
Lead (Pb)	1.273	-4.705	1.46203-[ln hardness](0.145712)]
Manganese (Mn)	0.3331	5.8743	
Nickel (Ni)	0.8460	0.0584	0.997
Zinc (Zn)	0.9094	0.6235	0.986

orado State Line.

Aquatic Life		
Chronic	Human Health-Organism Only	Type
a		
	640	P
150	9.0	C,P
a		
11		
a		
11		

"a" means refer to "Metals ALC" tab

a		
5.2	140	
a		
a		
0.77		
	0.3 mg/kg in fish tissue	P
1,895		
a	4,600	P
	4,200	P
5.0		
	0.47	P
a	26,000	P
	990	
	9	
	2.5	C
	0.00050	C,P
	40,000	
	510	C
	0.0020	C
	0.18	C
	0.18	C,P
	0.18	C
	0.18	C
	0.049	C
	0.17	C
	1.8	

	5.3	C
	65,000	
	22	C
	1,400	C
	1,900	
	16	C
0.0043	0.0081	C,P
	1,600	
	130	C
	4,700	C
	1,600	
	150	
	0.18	C
0.17		
0.001	0.0022	C,P
	0.18	C
	4,500	
	1,300	
	960	
	190	
	0.28	C
	170	C
	370	C
	7,100	C
	290	
	150	C
	210	C
0.056	0.00054	C,P
	44,000	
	1,100,000	
	850	
	5,300	
	34	C
	5.1E-08	C,P
	2.0	C
0.056	89	
0.056	89	
	89	
0.036	0.060	
	0.30	
	2,100	
	140	
	5,300	
0.0038	0.00079	C

0.0038	0.00039	C
	0.0029	C,P
	180	C
	1,100	
	33	C
	0.18	C
	9,600	C
	1,500	
	280	
	5,900	C
	690	
	30	C
	5.1	C
	60	C
6.6		
0.014	0.00064	C,P
15	30	C
	860,000	
	4,000	
	40	C
	33	C,P
	15,000	
0.0002	0.0028	C
	10,000	
	70	
	160	C
	300	C
	24	C
	24	C



## **Metals Aquatic Life Criteria**

Insert sample hardness to calculate the criteria.

Metal	Hardness	Acute Criterion	Chronic Criterion
Aluminum	50	1324	530
Cadmium	50	0.91	0.28
Chromium III	50	323	42
Copper	50	7	5
Lead	50	30	1
Manganese	50	2370	1309
Nickel	50	260	29
Silver	50	1.0	n/a
Zinc	50	85	65

## Ammonia Aquatic Life Criteria

Acute aquatic life criteria for total ammonia are dependent on pH and the presence or absence of salmonids. The criteria in mg/L as N based on analysis of unfiltered samples are as follows:

pH	Where Salmonids Present	Where Salmonids Absent
6.5 and below	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0 and above	0.885	1.32

Chronic aquatic life criteria for total ammonia are dependent on pH, temperature and whether fish in early life stages are present or absent. The criteria are based on analysis of unfiltered samples and are calculated according to the equations in Paragraphs (1) and (2) of this subsection. For temperatures below 0°C, the criteria for 0°C apply; for temperatures above 30°C, the criteria for 30°C apply. For pH values below 6.5, the criteria for 6.5 apply; for pH values above 9.0, the criteria for 9.0 apply.

(1) Chronic aquatic life criteria for total ammonia when fish early life stages are present.

(a) The equation to calculate chronic criteria in mg/L as N is:

$$((0.0577/(1 + 10^{7.688-\text{pH}})) + (2.487/(1 + 10^{\text{pH}-7.688}))) \times \text{MIN}(2.85, 1.45 \times 10^{0.028 \times (25-\text{T})})$$

(b) Selected values of calculated chronic criteria in mg/L as N:

pH	Temperature (deg C)						
	0 and below	14	15	16	18	20	22
6.5 and below	6.67	6.67	6.46	6.06	5.33	4.68	4.12
6.6	6.57	6.57	6.36	5.97	5.25	4.61	4.05
6.7	6.44	6.44	6.25	5.86	5.15	4.52	3.98
6.8	6.29	6.29	6.10	5.72	5.03	4.42	3.89
6.9	6.12	6.12	5.93	5.56	4.89	4.30	3.78
7.0	5.91	5.91	5.73	5.37	4.72	4.15	3.65
7.1	5.67	5.67	5.49	5.15	4.53	3.98	3.50
7.2	5.39	5.39	5.22	4.90	4.31	3.78	3.33
7.3	5.08	5.08	4.92	4.61	4.06	3.57	3.13
7.4	4.73	4.73	4.59	4.30	3.78	3.32	2.92
7.5	4.36	4.36	4.23	3.97	3.49	3.06	2.69
7.6	3.98	3.98	3.85	3.61	3.18	2.79	2.45
7.7	3.58	3.58	3.47	3.25	2.86	2.51	2.21
7.8	3.18	3.18	3.09	2.89	2.54	2.23	1.96
7.9	2.80	2.80	2.71	2.54	2.24	1.96	1.73
8.0	2.43	2.43	2.36	2.21	1.94	1.71	1.50
8.1	2.10	2.10	2.03	1.91	1.68	1.47	1.29
8.2	1.79	1.79	1.74	1.63	1.43	1.26	1.11
8.3	1.52	1.52	1.48	1.39	1.22	1.07	0.941
8.4	1.29	1.29	1.25	1.17	1.03	0.906	0.796
8.5	1.09	1.09	1.06	0.990	0.870	0.765	0.672
8.6	0.920	0.920	0.892	0.836	0.735	0.646	0.568
8.7	0.778	0.778	0.754	0.707	0.622	0.547	0.480
8.8	0.661	0.661	0.641	0.601	0.528	0.464	0.408
8.9	0.565	0.565	0.548	0.513	0.451	0.397	0.349
9.0 and above	0.486	0.486	0.471	0.442	0.389	0.342	0.300

(2) Chronic aquatic life criteria for total ammonia when fish early life stages are absent.

(a) The equation to calculate chronic criteria in mg/L as N is:

$$((0.0577/(1 + 10^{7.688-\text{pH}})) + (2.487/(1 + 10^{\text{pH}-7.688}))) \times 1.45 \times 10^{0.028 \times (\text{MAX}(\text{T}, 7))}$$

(b) Selected values of calculated chronic criteria in mg/L as N:

pH	Temperature (deg C)						
	0 and below	7	8	9	10	11	12
6.5 and below	10.8	10.8	10.1	9.51	8.92	8.36	7.84
6.6	10.7	10.7	9.99	9.37	8.79	8.24	7.72

6.7	10.5	10.5	9.81	9.20	8.62	8.08	7.58
6.8	10.2	10.2	9.58	8.98	8.42	7.90	7.40
6.9	9.93	9.93	9.31	8.73	8.19	7.68	7.20
7.0	9.60	9.60	9.00	8.43	7.91	7.41	6.95
7.1	9.20	9.20	8.63	8.09	7.58	7.11	6.67
7.2	8.75	8.75	8.20	7.69	7.21	6.76	6.34
7.3	8.24	8.24	7.73	7.25	6.79	6.37	5.97
7.4	7.69	7.69	7.21	6.76	6.33	5.94	5.57
7.5	7.09	7.09	6.64	6.23	5.84	5.48	5.13
7.6	6.46	6.46	6.05	5.67	5.32	4.99	4.68
7.7	5.81	5.81	5.45	5.11	4.79	4.49	4.21
7.8	5.17	5.17	4.84	4.54	4.26	3.99	3.74
7.9	4.54	4.54	4.26	3.99	3.74	3.51	3.29
8.0	3.95	3.95	3.70	3.47	3.26	3.05	2.86
8.1	3.41	3.41	3.19	2.99	2.81	2.63	2.47
8.2	2.91	2.91	2.73	2.56	2.40	2.25	2.11
8.3	2.47	2.47	2.32	2.18	2.04	1.91	1.79
8.4	2.09	2.09	1.96	1.84	1.73	1.62	1.52
8.5	1.77	1.77	1.66	1.55	1.46	1.37	1.28
8.6	1.49	1.49	1.40	1.31	1.23	1.15	1.08
8.7	1.26	1.26	1.18	1.11	1.04	0.976	0.915
8.8	1.07	1.07	1.01	0.944	0.855	0.829	0.778
8.9	0.917	0.917	0.860	0.806	0.756	0.709	0.664
9.0 and above	0.790	0.790	0.740	0.694	0.651	0.610	0.572

At 15°C and above, the criterion for fish early life stages absent is the same as the criterion for fish early life stages present (refer to table in Paragraph (1) of this subsection).

monids. The criteria

early life stages are  
ing to the equations in  
temperatures above  
ve 9.0, the criteria for

<b>24</b>	<b>26</b>	<b>28</b>	<b>30 and above</b>
3.62	3.18	2.80	2.46
3.56	3.13	2.75	2.42
3.50	3.07	2.70	2.37
3.42	3.00	2.64	2.32
3.32	2.92	2.57	2.25
3.21	2.82	2.48	2.18
3.08	2.70	2.38	2.09
2.92	2.57	2.26	1.99
2.76	2.42	2.13	1.87
2.57	2.26	1.98	1.74
2.37	2.08	1.83	1.61
2.16	1.90	1.67	1.47
1.94	1.71	1.50	1.32
1.73	1.52	1.33	1.17
1.52	1.33	1.17	1.03
1.32	1.16	1.02	0.897
1.14	1.00	0.879	0.773
0.973	0.855	0.752	0.661
0.827	0.727	0.639	0.562
0.700	0.615	0.541	0.475
0.591	0.520	0.457	0.401
0.499	0.439	0.386	0.339
0.422	0.371	0.326	0.287
0.359	0.315	0.277	0.244
0.306	0.269	0.237	0.208
0.264	0.232	0.204	0.179

<b>13</b>	<b>14</b>	<b>15 and above</b>
7.35	6.89	6.46
7.24	6.79	6.36

7.11	6.66	6.25
6.94	6.51	6.10
6.75	6.33	5.93
6.52	6.11	5.73
6.25	5.86	5.49
5.94	5.57	5.22
5.60	5.25	4.92
5.22	4.89	4.59
4.81	4.51	4.23
4.38	4.11	3.85
3.95	3.70	3.47
3.51	3.29	3.09
3.09	2.89	2.71
2.68	2.52	2.36
2.31	2.17	2.03
1.98	1.85	1.74
1.68	1.58	1.48
1.42	1.33	1.25
1.20	1.13	1.06
1.01	0.951	0.892
0.858	0.805	0.754
0.729	0.684	0.641
0.623	0.584	0.548
0.536	0.503	0.471

early life